

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Amended) A process for the preparation of a solid carbon charcoal residue comprising:
pyrolysis of pyrolyzing a biomass and or other carbonaceous material materials
releasing at a temperature between 350°C to 500°C to produce a pyrolytic gas high in
comprising volatile organic compounds and producing a solid carbon charcoal residue;
and
contacting all or a portion of the solid carbon charcoal residue, ammonia, and
water with an off-gas stream of a combustion or other process, wherein the gas stream
comprises carbon dioxide, sulfur dioxide or nitrous oxide, to reduce the discharge of
carbon dioxide, sulfur dioxide or nitrous oxide into the atmosphere.
2. (Amended) ~~The process as in Claim 1~~ A process for the preparation of a solid carbon charcoal residue comprising:
pyrolyzing a biomass or other carbonaceous material at a temperature range of
between 350°C to 500°C ~~where the temperature of the charcoal is managed to such that~~
~~its does not exceed the temperature range between 350C where 500C for no more than 2~~
minutes to maximize the formation of surface ~~acids~~ acid groups and preferential
adsorption of ~~bases which include ammonia~~ a base that is optionally ammonia.
3. (Amended) The process as in Claim 1 where the temperature of the ~~resulting char~~
~~particles~~ solid carbon charcoal residue exceeds ~~500C~~ 500°C and is ~~further heated or~~
~~allowed to oxidized~~ where the temperature remains above ~~600C~~ 600°C for greater than 10
minutes to minimize the production of surface acids groups.
4. (Amended) The process as in Claims 1, 2 ~~and or~~ 3 wherein the residue is further
processed under various conditions, including but not limited to pressure, mechanical
actions, heat, steam, oxygen, acid, carbon dioxide, addition of fertilizer components, ~~such~~

as which are optionally potassium, magnesium, ammonium sulfate, ammonium nitrate, or micro mineral nutrients such as including iron molybdenum minerals, to optimize ~~it~~ the residue for specific applications as an adsorbent and carrier of other materials.

5. (Amended) The process as in Claim 1, ~~where in~~ wherein the gas is further processed using ~~ceramic membranes to the convert and extract a purified hydrogen stream, or by~~ using ceramic membranes, steam reforming or ~~eatalytically~~ catalytic reforming ~~of the pyrolysis or synthesis gas to produce a mixture gases including hydrogen, carbon monoxide, methane and carbon dioxide and where the carbon monoxide is produced it is converted through a high temperature or low temperature catalytic CO water shift reaction to hydrogen where hydrogen and carbon dioxide are the major components of the resulting gas.~~
6. (Amended) The process as in Claim 5, ~~for~~ further comprising separating ~~the any~~ unpurified hydrogen from carbon dioxide, nitrogen or other parasitic gases ~~using standard industrial techniques, such as pressure swing adsorption, or membrane separation.~~
7. ~~A~~ The process in accordance with Claims 1, 5 and or 6, ~~where the combination of the hydrogen and air are used in standard industrially accepted techniques to produce further comprising combining the hydrogen stream with nitrogen to produce ammonia or ammonium nitrate or other nitrogen compounds typical to these industry practices.~~
8. (Amended) The process in accordance with Claims 1, 2, 3 and or 4, ~~whereby~~ wherein all or a portion of the solid carbon charcoal residue, and ammonia, and water is are injected or brought into intimate contact with ~~the~~ an off-gas stream of a combustion or other process where such gas stream has a concentration of ~~carbon dioxide, sulfur dioxide and or nitrous oxide and where there is a desire to reduce the discharge of these materials into the atmosphere.~~
9. (Amended) ~~The process in accordance with Claims 3 and 4, whereby~~ A process for the preparation of a solid carbon charcoal residue comprising:

pyrolyzing a biomass or other carbonaceous material at a temperature between 350°C to 500°C to produce a pyrolytic gas comprising volatile organic compounds and a solid carbon charcoal residue; and

contacting all or a portion of the solid carbon charcoal residue, and ammonia, and water is injected or brought into intimate contact with the off-gas stream of a combustion or other process where such gas stream has a concentration of with carbon dioxide ; sulfur dioxide and nitrous oxide and where there is a desire to reduce the discharge of these materials into the atmosphere.

10. (Amended) The process in accordance with ~~Claims~~ Claim 1 or 8 9, where the charcoal residue and ammonia, water and off gases are held in intimate contact for at least 5 seconds.
11. (Amended) The process as in Claim 1, 8, 9 or 10 wherein ~~the a~~ a chemical reaction ~~will occurs to~~ allow ammonium bicarbonate (NH_4HCO_3) to be formed in the charcoal pores and onto its surface to produce NH_4HCO_3 - charcoal fertilizers.
12. (Amended) The process as in Claim ~~10~~ 1 or 8 wherein ~~the a~~ a chemical reaction ~~also allows further occurs to allow~~ the formation of ammonium salts of nitrogen oxides and sulfur dioxide to be formed in contact with NH_4HCO_3 -charcoal fertilizers.
13. (Amended) ~~The creation of a~~ A solid carbon charcoal residue comprising a slow release sequestering soil amendment fertilizer to be combined with materials used by plant growth and depositing these materials deposited inside the internal pore structures of the carbon residue ~~making in the form of~~ a solid powder and or granular material suitable for large scale agricultural applications.
14. (Amended) A process in accordance with Claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, ~~or 12, or 13~~ where these compounds beneficial for plant growth are ~~created or~~ adsorbed onto the internal pore structure of the carbon charcoal residue ~~creating to form~~ a material which provides a slow release of the compounds.

15. (Amended) A process in accordance with Claim ~~13~~ 14, and wherein a coating is used to ~~facilitate the handling, flow and added~~ control of the rate of release of ~~those the~~ compounds, and ~~where such materials as are commonly used to create coatings such as but not limited to~~ wherein the coating is optionally selected from the group consisting of gypsum, plaster, sulfur, or polymers as materials which can dissolve or create a permeable layer when placed in the soil.
16. (Amended) The use of a material ~~as a soil amendment and fertilizer made with the by the~~ process of processes described in Claims 1 through 11 or 14-15 and ~~creating those materials as described in Claims 11, 12 or 13~~ as a soil amendment and fertilizer.
17. (New) A solid carbon residue produced by a process of claims 1, 2, 7 or 9.
18. (New) The process of claim 1, wherein the step of contacting the solid carbon charcoal residue, ammonia, and water with the gas stream further comprises at least one of the conversion of carbon dioxide to ammonium bicarbonate, the conversion of sulfur dioxide to ammonium sulfate, and the conversion of nitrous oxide to ammonium nitrate.
19. (New) A fertilizer comprising a porous solid carbon charcoal residue comprising ammonium bicarbonate in the pores.
20. (New) The fertilizer of claim 19 in the form of a solid powder or granular material.